

Organic Fertilizer And Manure Of Vermicompost

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Abstract

Vermi Composting Or Worm Composting Is A Simple Technology For Converting Biodegradable Waste Into Organic Manure With The Help Of Earthworms. Earthworms Are Valued By Farmers Because, In Addition To Aerating The Soil, They Digest Organic Matter And Produce Castings That Are A Valuable Source Of Humus. A Number Of Researchers Throughout The World Have Found That The Nutrient Profile In Vermicompost Is Generally Higher Than Traditional Compost. Although Vermicomposts Have Been Shown To Improve Plant Growth Significantly, The Application Of Vermicomposts At High Concentrations Could Impede Growth Due To The High Concentrations Of Soluble Salts Available In Vermicomposts.

Keywords: *Earthworms; Nutrients; Organic Fertilizer; Plant Development; Vermicomposting; Waste Management.*

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I. Introduction

Vermicomposting is the processing of organic wastes through earthworms. Vermicomposting is a much faster and easier way to convert unwanted kitchen scraps and other household wastes to valuable nutrients for the garden. In the traditional composting process, bacteria and fungi break down material over an extended time frame until the homeowner is left with compost. The process can take anywhere from six months to two years depending on factors such as compost ingredients, turning of the pile, moisture levels, and more. With vermicomposting, food scraps and other household “brown” waste such as shredded paper, are added to a bin containing worms. As the waste breaks down and the worms continue to munch away, the homeowner is left with a rich, nutritious mix of compost and worm casings, or “vermicompost”. Vermicomposting is a type of composting in which certain species of earthworms are used to enhance the process of organic waste conversion and produce a better end-product. It is a mesophilic process utilizing microorganisms and earthworms. Earthworms feed the organic waste materials and pass them through their digestive system and give out in a granular form (cocoons) which is known as vermicompost. It is also cost effective and eco friendly waste management. Due to its innate biological, biochemical and physicochemical properties, vermicomposting can be used to promote sustainable ruminant manure management. Vermicomposts are excellent sources of biofertiliser and their addition improves the physicochemical and biological properties of agricultural soils. In addition, earthworms from the vermicomposting can be used as source of protein to fishes and mono gastric animals.



Vermicompost

II. Methodology

Vermi compost acts as an inoculant in the production of compost. Vermicomposting has immense uses in the society where agriculture is the main source of living. Process where organic wastes are composted using selected species of worms such as earthworm, red wigglers and white worms are converted in to vermi compost or humans or worm manure. Organic farming is the key principle that is followed by one of the most sustainable agriculture practices known as Vermicomposting. Vermicomposting is not unnatural but an organic fertilizer that makes use of earthworms that transfers organic elements into manure. Earthworms play an important role and are very important as they help the complex organic matter to decompose into manure just by lowering the C: N ratio. This will help to enhance not only the properties of the soil but microbial activities as well. They also improve the soil exhibit to the microorganisms. This process is environmentally friendly as it helps to transfer biodegradable waste into vermicomposting. Moreover, Humus, nitrogen (2-3 percent), phosphorus (1.55-2.25 percent), potassium (1.85-2.25 percent), micronutrients, and other beneficial soil bacteria are all abundant in vermicompost. The population of nitrogen-fixing bacteria and actinomycetes increases when vermicompost is used. Overall, it's an excellent organic amendment for increasing crop development and output.

There are two methods of vermicompost, they are as follows:

- **Pit method:** In this method of vermicomposting, the process is done in pits that are made up of cement. Moreover, this type of vermicomposting is not frequently used by people or farmers.
- **Bed method:** In this type of vermicomposting, on the floor beds are made and are very easy to maintain as well. This type of vermicomposting is frequently used by people or farmers.



1. Collection of Material



2. Crushing the materials of earthworms



3. Pre-composting the material



4. Covered with Jute bags.



5. *Eisenia fetida*.



6. Watering



7. Sieving of vermi compost.



8. Vermicompost and raw material analysis.

- A 1 meter by 1 meter by 0.3 meter container carries about 30-40 kg of bedding and feeding materials.
- It is possible to prepare a vermiculture bed or worm bed (3 cm) by putting dust or husk or coir waste or sugar cane garbage in the bottom of the tub/container.
- The culture bed can be spread with a sheet of fine sand (3 cm) followed by a layer of garden soil (3 cm).
- It is sprinkled with rock phosphate powder (to increase the content of phosphate) if required.
- Soil or cow dung is used to cover the organic layer with (sprinkle cow dung slurry).
- In order to prevent birds from eating the earthworms, cover the ring with wire mesh or gunny sack.
- Water is sprinkled to maintain adequate humidity and temperature regularly/daily.

Nutrition value of Vermi compost

Content	Composition
Organic Carbon	9.54 - 17.98%
Nitrogen	0.5 - 1.5%
Phosphorous	0.1 - 0.3%
Potassium	0.15 - 0.56%
Sodium	0.06 - .3%
Calcium and Magnesium	22.67 – 47.6 meq/100gm
Copper	2-9.5 mg/kg
Iron	2-9.3 mg/kg
Zinc	5.7 – 11.50 mg/kg
Sulphur	128-548 mg/kg

III. Result & Discussion

In a period of 2-3 months, the compost will be ready. The material will become moderately loose, will weigh less, shaped like granules, black in color, crumbly and rich with humus. If the earthworm casting is present on the bed of compost, it means that the compost is ready. 2 or 3 days of emptying the compost bed, adding water to compost must be ceased. This helps in separation of the worms from the compost. In the multi-pit system, supplying water should be ceased in the first pit, which will allow the worms to automatically migrate to another pit. In the other pit the worms have appropriate conditions for their growth and hence maintained cyclically, and continuous harvesting could be done. Vermicomposting transforms the organic waste which is green in color, to a dark soil which enriches in nutrients. This is mainly because of the degradation of microorganisms, and therefore maintaining a soil which is healthy for growing plants.

IV. Conclusion

The nutrient profile of vermi compost is typically higher than conventional compost. Vermi compost application in soil not only improves structure and aggregation but also enhance the amount of organic matter, nutrient status, potential for cation exchange, microbial activities, and carbon microbial biomass and enzyme activities. Thereby, help in promoting plant growth and sustain soil health. Hence, this input is proven as boon to the farmers. To take full advantage of vermi compost, plough it well in the soil at the time of sowing. The expenditure on costly chemical fertilizer input may be reduced to some extent by applying vermi compost in crops. Vermi composting involves the “cooperation” between earthworms and microorganisms during a very complex biological process. In addition, there is a possibility of vermi compost application in pollution reduction, which is for sure a topic that should be immediately addressed. Considering that, there are still many unknowns that need to be investigated and optimized in order to use vermi compost products in the context of sustainable agriculture.

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